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FOR 595.01: The Nature and Significance of Soluble Organic Nitrogen in Soil Ecosystems

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**Special Problems in Soil Biochemistry
Forestry 595**

Fall 2005

The Nature and Significance of Soluble Organic Nitrogen in Soil Ecosystems

Instructor: Tom DeLuca
Text: None
Meeting Time: T 11:30 – 12:20
Meeting Room: 403 SC
First class: Monday August 29, 2005

This year we are taking on the subject of soluble organic nitrogen (N) with specific interest in what portion of this pool is available for microbial and plant uptake. Historically it was assumed that all plant N uptake was in the form of inorganic N (NH_4^+ or NO_3^-). It was later shown that microorganisms were capable of direct assimilation of organic N sources and more recently that certain plants (either directly or via mycorrhizal fungi) can also access organic N in the form of amino acids. This has led to a new N uptake hype: organic N is a (or the) major form of N taken up by plants. Furthermore, numerous ecosystem studies have suggested that the high concentrations of dissolved organic N (DON) represent an important available form of N; however, little of this DON pool is amino N and thus very little of it is available for plant or microbial uptake. It is our objective this semester to delve into the world of organic N and separate the wheat from the chaff.

Objectives:

Explore the chemistry, biology and biochemistry of organic N in the soil ecosystem and its significance in both natural (prairie, tundra, and grassland) and managed (agricultural) ecosystems.

Approach:

We will review of existing literature dealing with this topic and evaluate the significance of this large, yet poorly understood pool of N in the soil ecosystem. Each student will lead a discussion on a given paper of their choice dealing with this subject. The student will be assigned a date and have to provide a paper to the instructor one week before their section. The instructor will copy the paper and make it available to all other students in the class. All students will then read the paper and come to class prepared to critique and discuss the paper. Grades will be dependent upon participation and preparation. Depending on the number of students in class, we may double up and have two papers in one day or have two students present one particularly complex or lengthy paper.

**Fall 2005
Course Schedule**

<u>Week</u>	<u>Subject</u>
August 29	Course Introduction: Who is DON? (DeLuca)
September 5	Labor Day Holiday
September 12	History of plant organic N uptake (DeLuca)
September 19	Soluble amino acid N in prairie and agricultural ecosystems (DeLuca)
September 26	Polyphenolic N in forest ecosystems (DeLuca)
October 3	Student paper 1
October 10	Student paper 2
October 17	Student paper 3
October 24	Student paper 4
November 7	No Class (Soil Science Meetings)
November 14	Student paper 5
November 21	Student paper 6
November 28	Student paper 7
December 5	Student paper 8
December 12	Student paper 9 and course synthesis